WHAT IS CLAIMED IS:

1. A control system for processing sampled servo data in a disk drive, the control system comprising:

a microprocessor for executing firmware code; and

an accelerator circuit for performing operations on the sampled servo data while the microprocessor is executing the firmware code, the accelerator circuit comprising

a position error signal (PES) calculator circuit for calculating a PES value based on the sampled servo data; and

a write unsafe (WUS) estimator responsive to the calculated PES value and to a WUS limit parameter, the WUS estimator further for signaling the microprocessor when the calculated PES value exceeds the WUS limit parameter.

2. A control system for processing sampled servo data as defined in claim 1, further comprising a bus for transmitting the WUS limit parameter from the microprocessor to the accelerator circuit.

3. A control system for processing sampled servo data as defined in claim 1, wherein the accelerator circuit further comprises a WUS limit register for storing the WUS limit parameter.

4. A control system for processing sampled servo data as defined in claim 1, wherein the accelerator circuit further comprises a PES register for storing the calculated PES value.

5. A control system for processing sampled servo data as defined in claim 1, wherein the PES value is further based on a parameter stored in a parameter register.

6. A control system for processing sampled servo data as defined in claim 1, wherein the servo processing accelerator circuit has a plurality of multipliers that may simultaneously perform parallel calculations.

7. A control system for processing data from sampled servo wedges for positioning a transducer head in a disk drive, the control system comprising:

a microprocessor for executing firmware code; and

a servo processing accelerator circuit for executing servo processing functions while the microprocessor is executing the firmware code, the servo processing accelerator circuit comprising

a position error signal (PES) calculator circuit for calculating a stream of PES values based on data read from the sampled servo wedges;

a servo-loop compensator for processing the stream of PES values and generating a stream of control effort values for positioning the transducer head during a track following operation.

8. A control system for processing data from sampled servo wedges as defined in claim 7, wherein the PES values are further based on parameters stored in corresponding parameter registers.

9. A control system for processing data from sampled servo wedges as defined in claim 7, wherein the servo processing accelerator circuit has a plurality of multipliers that may simultaneously perform parallel calculations.

10. A control system for processing data from sampled servo wedges for positioning a transducer head in a disk drive, the control system comprising:

a microprocessor for executing firmware code; and

a servo processing accelerator circuit for executing servo processing functions while the microprocessor is executing the firmware code, the servo processing accelerator circuit including a servo-loop compensator for receiving a stream of PES values based on data read from the sampled servo wedges and generating a stream of control effort values based on the stream of PES values for positioning the transducer head during a track following operation.

11. A control system for processing data from sampled servo wedges as defined in claim 10, wherein the PES values are further based on parameters stored in corresponding parameter registers.

12. A control system for processing data from sampled servo wedges as defined in claim 10, wherein the servo processing accelerator circuit has a plurality of multipliers that may simultaneously perform parallel calculations.

13. A magnetic disk drive, comprising:

a head disk assembly (HDA) including

a rotating magnetic disk having distributed position information in a plurality of uniformly spaced-apart servo wedges for defining data storage tracks,

an actuator for positioning a transducer head in response to a control effort signal, the transducer head for periodically reading the distributed position information from the servo wedges and reading data from the data storage tracks; and

a control system having

an accelerator circuit for implementing a first sampled servo controller for periodically adjusting, only during a track-following operation under one or more of a first set of predetermined conditions, the control effort signal based on the distributed position information, and for indicating the occurrence of a predetermined condition within a second set of predetermined conditions to the control system;

a second sampled servo controller, separate from the accelerator circuit, for periodically adjusting the control effort signal based on the distributed position information during a track-following operation under one or more of the second set of predetermined conditions.

14. A magnetic disk drive as defined in claim 13, wherein

the control system further includes a disk controller for controlling disk operations and a host interface for coupling the disk controller with a host system; and

the second sampled servo controller, the disk controller and the host interface are implemented by a microprocessor that is separate from the accelerator circuit.

15. A magnetic disk drive as defined in claim 13, wherein the second sampled servo controller is implemented by the microprocessor using firmware code.

16. A magnetic disk drive as defined in claim 13, wherein the accelerator circuit has a plurality of multipliers that may simultaneously perform parallel calculations.

17. A magnetic disk drive as defined in claim 13 wherein the first set of predetermined conditions includes track following within a write unsafe limit.

18. A magnetic disk drive as defined in claim 13 wherein the second set of predetermined conditions includes track following outside of a write unsafe limit.

19. A magnetic disk drive as defined in claim 13, wherein, after receiving distributed position information in a servo wedge, the first sampled servo controller can adjust the control effort signal after a first processing delay and the second sampled servo controller can adjust the control effort signal after a second processing delay, wherein the first processing delay is less than the second processing delay.

20. A magnetic disk drive as defined in claim 19, wherein the first processing delay is less than one-tenth of the second processing delay.

21. A magnetic disk drive as defined in claim 19, wherein the first processing delay is less than one-fourth of the second processing delay.

22. A magnetic disk drive, comprising:

a head disk assembly (HDA) including

a rotating magnetic disk having distributed position information in a plurality of uniformly spaced-apart servo wedges for defining data storage tracks,

an actuator for positioning a transducer head in response to a control effort signal, the transducer head for periodically reading the distributed position information from the servo wedges and reading data from the data storage tracks; and

a control system having

an accelerator circuit for implementing a first sampled servo controller for periodically adjusting, only during a track-following operation under one or more of a first set of predetermined conditions, the control effort signal based on the distributed position information with a first processing delay;

a microprocessor, separate from the accelerator circuit, for implementing a second sampled servo controller using firmware code for periodically adjusting the control effort signal based on the distributed position information, with a second processing delay that is substantially greater than the first processing delay, during an operation under one or more of a second set of predetermined conditions;

wherein the control system selects the first sampled servo controller for adjusting the control effort signal during a track-following operation under one or more of a first set of predetermined conditions, and selects the second sampled servo controller for adjusting the control effort signal during an operation under one or more of a second set of predetermined conditions.

23. A magnetic disk drive as defined in claim 22, wherein the first processing delay is less than one-tenth of the second processing delay.

24. A magnetic disk drive as defined in claim 22, wherein the first processing delay is less than one-fourth of the second processing delay.

25. A magnetic disk drive as defined in claim 22, wherein

the control system further includes a disk controller for controlling disk operations and a host interface for coupling the disk controller with a host system; and

the second sampled servo controller, the disk controller and the host interface are implemented by a microprocessor that is separate from the accelerator circuit.

26. A magnetic disk drive as defined in claim 22, wherein the second sampled servo controller is implemented by the microprocessor using firmware code.

27. A magnetic disk drive as defined in claim 22, wherein the accelerator circuit has a plurality of multipliers that may simultaneously perform parallel calculations.

28. A magnetic disk drive as defined in claim 22 wherein the first set of predetermined conditions includes track following within a write unsafe limit.

29. A magnetic disk drive as defined in claim 22 wherein the second set of predetermined conditions includes track following outside of a write unsafe limit.